

**UNITED STATES DISTRICT COURT
FOR THE WESTERN DISTRICT OF TEXAS
WACO DIVISION**

KATANA SILICON TECHNOLOGIES LLC,

Plaintiff,

v.

TAIWAN SEMICONDUCTOR
MANUFACTURING COMPANY, LTD., TSMC
NORTH AMERICA, INC., and TSMC
TECHNOLOGY, INC.

Defendants.

Case No.: 6:19-CV-695

JURY TRIAL DEMANDED

COMPLAINT FOR PATENT INFRINGEMENT

Plaintiff Katana Silicon Technologies LLC (“Katana”), for its Complaint against Defendants Taiwan Semiconductor Manufacturing Company, Ltd., TSMC North America, Inc., and TSMC Technology, Inc. (collectively, “Defendants” or “TSMC”) states as follows:

NATURE OF THE CASE

1. This is an action for patent infringement of United States Patent Nos. 6,291,861; 6,677,212, 6,181,002, 6,352,879, RE38,806, 7,279,741, and 7,402,903 (collectively, the “Patents-in-Suit”) under the patent laws of the United States, 35 U.S.C. § 1 et seq., including 35 U.S.C. §§ 271, 281, 283, 284, and 285.

PARTIES

2. Plaintiff Katana Silicon Technologies LLC is a corporation and existing under the laws of the State of Texas, with its principal place of business at 8105 Razor Boulevard, Suite 210, Plano, Texas 75024.

3. Defendant Taiwan Semiconductor Manufacturing Company, Ltd. is a company organized under the laws of Taiwan with its principal place of business at No. 8, Lin-Hsin Road 6, Hsinchu Science Park, Hsinchu 300-78, Taiwan, Republic of China.

4. Defendant TSMC North America, Inc. is a wholly owned subsidiary of Defendant Taiwan Semiconductor Manufacturing Company, Ltd. TSMC North America, Inc. is a California corporation, and has a physical place of business at 1921 North Mopac Expressway, Austin, Texas 78759. TSMC North America, Inc. is actively transacting business in Texas and this District. The Registered Agent for process is Steven A. Schulman, 2851 Junction Avenue, San Jose, California 95134.

5. Defendant TSMC Technology, Inc. is a Delaware corporation with its principal place of business at 2851 Junction Avenue, San Jose, California 95134. TSMC Technology, Inc. is a wholly owned subsidiary of Taiwan Semiconductor Manufacturing Company, Ltd.

6. Defendants Taiwan Semiconductor Manufacturing Company, Ltd., TSMC North America, Inc., and TSMC Technology, Inc. are related entities that work in concert to design, manufacture, import, distribute, market, and/or sell the infringing devices.

JURISDICTION

7. This action arises under the Patent Laws of the United States, 35 U.S.C. § 1 *et seq.*, including 35 U.S.C. §§ 271, 281, 283, 284, and 285.

8. This is a patent infringement lawsuit over which this Court has subject matter jurisdiction under 28 U.S.C. §§ 1331, 1332 and 1338(a).

9. Defendants are subject to this Court's specific and general personal jurisdiction pursuant to due process and/or the Texas Long Arm Statute, by virtue of at least to its substantial business conducted in this forum, directly and/or through intermediaries, including (i) having solicited business in the State of Texas, transacted business within the State of Texas and attempted

to derive financial benefit from residents of the State of Texas, including benefits directly related to the instant patent infringement causes of action set forth herein; (ii) having placed its products and services into the stream of commerce throughout the United States and having been actively engaged in transacting business in Texas and in this District; and (iii) either alone or in conjunction with others, having committed acts of infringement within Texas and in this District.

10. On information and belief, within the District, Defendants directly and/or through intermediaries have advertised (including through websites), offered to sell, sold and/or distributed infringing products, and/or have induced the sale and use of infringing products in the United States, Texas, and this District.

11. On information and belief, each Defendant has, directly or through its distribution network, purposefully and voluntarily placed such products in the stream of commerce knowing and expecting them to be purchased and used by consumers in Texas and this District.

12. On information and belief, each Defendant has committed direct infringement in Texas and this District.

13. On information and belief, each Defendant has committed indirect infringement based on acts of direct infringement in Texas and this District.

14. On information and belief, Defendants have derived substantial revenues from their infringing acts in this District, including from their manufacturing and sale of infringing products in the United States.

VENUE

15. Venue is proper against Taiwan Semiconductor Manufacturing Company, Ltd. in this District pursuant to 28 U.S.C. § 1391(c)(3).

16. Venue is proper against TSMC North America, Inc. in this District pursuant to 28 U.S.C. § 1400(b) because TSMC North America, Inc. has a regular and established place of

business in this District and has committed acts of infringement in this District. TSMC North America, Inc. has a permanent office location at Stone Creek II, N. Mopac Expressway, Austin, Texas 78759, which is in Travis County and within this District.

17. TSMC North America, Inc. also employs full-time personnel such as sales personnel and engineers in this district, including in Austin, Texas. TSMC North America, Inc. has also committed acts of infringement in this district by commercializing, marketing, selling, distributing, testing, and/or servicing certain products accused of infringement in this action.

18. Venue is proper against TSMC Technology, Inc. in this District pursuant to 28 U.S.C. § 1400(b) because TSMC Technology, Inc. has a regular and establish place of business in this District and has committed acts of infringement in this District. TSMC Technology, Inc. has a permanent office location at 11921 N. Mopac Expressway, Austin, Texas 78759, which is in Travis County and within this District.

19. TSMC Technology, Inc. also employs full-time personnel such as engineers in this district, including in Austin, Texas. TSMC Technology, Inc. has also committed acts of infringement in this district by commercializing, marketing, selling, distributing, testing, and/or servicing certain TSMC-branded devices accused of infringement in this action.

20. Without limitation, on information and belief, within this District, Defendants directly and/or through intermediaries, have advertised (including through websites), offered to sell, sold, and/or distributed infringing products, and/or have induced the sale and use of infringing products.

21. On information and belief, each Defendant has transacted, and at the time of the filing of the Complaint, is continuing to transact business within this District.

22. On information and belief, each Defendant exercises direction and control over the performance of each other Defendant, or they form a joint enterprise such that the performance by one Defendant is attributable to each other Defendant.

BACKGROUND

23. On September 18, 2001, U.S. Patent Number 6,291,861 (the “’861 Patent”), entitled “Semiconductor Device and Method for Producing the Same,” was duly and legally issued by the United States Patent and Trademark Office. A true and correct copy of the ’861 Patent is attached as Exhibit A to this Complaint.

24. The ’861 Patent issued from U.S. patent application Serial Number 09/345,414 filed on June 30, 1999 and discloses a design and process of fabricating semiconductor devices.

25. More specifically, the ’861 Patent is directed towards field-effect transistors (“FETs”).

26. The ’861 Patent claims patent-eligible subject matter and is valid and enforceable.

27. Katana is the sole owner of all rights, title, and interest in and to the ’861 Patent including the right to sue for and collect past, present, and future damages and to seek and obtain injunctive or any other relief for infringement of the ’861 Patent.

28. Defendants are not licensed to the ’861 Patent in either an express or implied manner.

29. On January 13, 2004, U.S. Patent Number 6,677,212 (the “’212 Patent”), entitled “Elevated Source/Drain Field Effect Transistor and Method for Making the Same,” was duly and legally issued by the United States Patent and Trademark Office. A true and correct copy of the ’212 Patent is attached as Exhibit B to this Complaint.

30. The '212 Patent issued from U.S. Patent application Serial Number 10/070,478 filed on September 6, 2000 and discloses the use of an elevated source/drain field in order to reduce short channel effects and increase drive power.

31. More specifically, the '212 Patent is directed towards FETs.

32. The '212 Patent claims patent-eligible subject matter and is valid and enforceable.

33. Katana is the sole owner of all rights, title, and interest in and to the '212 Patent including the right to sue for and collect past, present, and future damages and to seek and obtain injunctive or any other relief for the infringement of the '212 Patent.

34. Defendants are not licensed to the '212 Patent in either an express or implied manner.

35. On January 30, 2001, U.S. Patent Number 6,181,002 (the "'002 Patent"), entitled "Semiconductor Device Having a Plurality of Semiconductor Chips," was duly and legally issued by the United States Patent and Trademark Office. A true and correct copy of the '002 Patent is attached as Exhibit C to this Complaint.

36. The '002 Patent issued from U.S. patent application Serial Number 09/460,245 filed on December 13, 1999 and discloses and relates to the design and specifications of fabricating semiconductor devices.

37. The '002 Patent claims patent-eligible subject matter and is valid and enforceable.

38. Katana is the sole owner of all rights, title, and interest in and to the '002 Patent including the right to sue for and collect past, present, and future damages and to seek and obtain injunctive or any other relief for the infringement of the '002 Patent.

39. Defendants are not licensed to the '002 Patent in either an express or implied manner.

40. On March 5, 2002, U.S. Patent Number 6,352,879 (the “’879 Patent”), entitled “Semiconductor Device and Method for Making the Same,” was duly and legally issued by the United States Patent and Trademark Office. A true and correct copy of the ’879 Patent is attached as Exhibit D to this Complaint.

41. The ’879 Patent issued from U.S. patent application Serial Number 09/604,081 filed on June 27, 2000 and discloses a design and process of fabricating semiconductor devices.

42. The ’879 Patent claims patent-eligible subject matter and is valid and enforceable.

43. Katana is the sole owner of all rights, title, and interest in and to the ’879 Patent including the right to sue for and collect past, present, and future damages and to seek and obtain injunctive or any other relief for infringement of the ’879 Patent.

44. Defendants are not licensed to the ’879 Patent in either an express or implied manner.

45. On October 4, 2005, U.S. Patent Number RE38,806 (the “’806 Patent”) entitled “Semiconductor Device and Method for Manufacturing the Same,” was duly and legally issued by the United States Patent and Trademark Office. A true and correct copy of the ’806 Patent is attached as Exhibit E to this Complaint.

46. The ’806 Patent issued from U.S. patent application Serial Number 10/428,013 filed on May 2, 2003 and discloses a design and process of fabricating semiconductor devices.

47. The ’806 Patent claims patent-eligible subject matter and is valid and enforceable.

48. Katana is the sole owner of all rights, title, and interest in and to the ’806 Patent including the right to sue for and collect past, present, and future damages and to seek and obtain injunctive or any other relief for the infringement of the ’806 Patent.

49. Defendants are not licensed to the '806 Patent in either an express or implied manner.

50. On October 9, 2007, U.S. Patent Number 7,279,741 (the "'741 Patent), entitled "Semiconductor Device with Increased Effective Channel Length and Method of Manufacturing the Same," was duly and legally issued by the USPTO. A true and correct copy of the '741 Patent is attached as Exhibit F to this Complaint.

51. The '741 Patent claims patent-eligible subject matter and is valid and enforceable.

52. Katana is the sole owner of all rights, title, and interest in and to the '741 Patent including the right to sue for and collect past, present, and future damages and to seek and obtain injunctive or any other relief for infringement of the '741 Patent.

53. On July 22, 2008, U.S. Patent Number 7,402,903 (the "'903 Patent), entitled "Semiconductor Device," was duly and legally issued by the USPTO. A true and correct copy of the '903 Patent is attached as Exhibit G to this Complaint.

54. The '903 Patent claims patent-eligible subject matter and is valid and enforceable.

55. Katana is the sole owner of all rights, title, and interest in and to the '903 Patent including the right to sue for and collect past, present, and future damages and to seek and obtain injunctive or any other relief for infringement of the '903 Patent.

56. Defendants own and operate a foundry in Taiwan which manufactures at least some of the infringing semiconductor devices.

57. Defendant TSMC North America, Inc. is a wholly owned subsidiary of Taiwan Semiconductor Manufacturing Company, Ltd. that sells manufactured chips in the United States, including those that incorporate the infringing technologies.

58. Defendants do a substantial amount of business with third parties who sell consumer products in the United States.

59. Defendants are constructively aware that a significant amount of its products are incorporated and eventually sold primarily in the United States.

DEFENDANTS' INFRINGING PRODUCTS AND METHODS

60. Transistors are semiconductor devices that are formed on wafers, which are made by foundries. Wafers contain multiple, identical chips which are designed by chip designers. Individual chips are cut from wafers and packaged. Those chips go into a variety of consumer products, such as smartphones, tablets, personal computers, and automobile parts and components. Chips are also referred to as “integrated circuits.”

61. A chip designer designs its own chips that go into consumer products. A “fabless” chip designer uses and/or contracts with foundries to manufacture chips. A foundry manufactures chips for its customers, which may include chip customer companies. A chip customer company then incorporates those chips into its consumer products. For example, TSMC is a foundry and has contracts with many prominent chip designers to manufacture chips which are eventually incorporated into many consumer products.

62. Defendants make, use, sell, offer for sale, and/or import into the United States processor chips that infringe at least claims 1-11, 17-20, 22, 24, and 25 of '861 Patent; claims 4, 6, and 8 of the '212 Patent; claims 1-3, 7-9, 13, and 14 of the '002 Patent; claims 1, 2, and 15 of the '879 Patent; claims 1, 12, 23, and 30 of the '806 Patent; claims 8-10, 12, 15, and 16 of the '741 Patent; and claims 8, 9, 11-17, and 19-22 of the '903 Patent.

63. Defendants manufacture semiconductor devices at a variety of different process nodes, including, the 7-nanometer (“7nm”), 10-nanometer (“10nm”), 12-nanometer (“12nm”), 16-

nanometer (“16nm”), 20-nanometer (“20nm”), 28-nanometer (“28nm”), 40-nanometer (“40nm”), and 45-nanometer (“45nm”) process nodes.

64. The semiconductor devices manufactured by Defendants are, in turn, incorporated into third party electronic components and products, such as computer chips, smartphones and other mobile devices, computer graphic cards, PC cameras, digital cameras and recorders, digital TVs, toys, security systems, video cameras, and other portable devices.

65. For example, semiconductor devices made according to Defendants’ 16nm process node have been incorporated into the Apple A9 chip, which has been incorporated into and for the Apple iPhone 6S and 6S plus products.

66. For example, semiconductor devices made according to Defendants’ 20nm process node have been incorporated into the Qualcomm MDM9235M 4G LTE modem, which has been incorporated into the Samsung Galaxy S5 product.

67. For example, semiconductor devices made according to Defendants’ 28nm process node have been incorporated into the Qualcomm MDM9215M 4G LTE advanced modem, which has been incorporated into the Samsung Galaxy S4 product.

68. For example, semiconductor devices made according to Defendants’ 40nm process node have been incorporated into the Altera Stratix IV GX FPGA.

69. Defendants also manufacture semiconductor packages using a variety of packaging technologies, including Integrated Fan-Out (InFO) wafer level packaging technology.

70. For example, TSMC uses its InFO wafer level packaging technology to manufacture the Apple A10 chip, which has been incorporated into the Apple iPhone 7 and 7 Plus products.

71. For example, TSMC uses its InFO wafer level packaging technology to manufacture the Apple A11 chip, which has been incorporated into the Apple iPhone 8, 8 Plus, and iPhone X products.

72. For example, TSMC uses a 40-nanometer and 45-nanometer ultra-low-power (ULP) CMOS process to manufacture the G8232 Rear-Cam ISP for use in the Sony IMX400, Broadcom BCM15900D0KWFBG Touch Screen Controller, Ambiq Micro Apollo2 Microcontroller, NVIDIA T33-P-A3 Application Processor, Freescale MCIMX6Q5EYM10AC Integrated Multimedia Application Processor, and MediaTek 40nm MT6577 Dual Core Application Processor, and other devices in which an insulating layer is used to prevent a short channel effect.

73. Defendants also manufacture Through-Silicon-Via (TSV) induced complementary metal–oxide–semiconductor (CMOS) image sensors (“TSV CMOS Image Sensors”).

74. In turn, Defendants’ TSV CMOS Image Sensors are incorporated into PC cameras, digital cameras and recorders, digital TVs, toys, security systems, video cameras and other portable devices.

75. The term “Accused Instrumentalities” used hereafter, shall refer to all products that the Defendants have manufactured by practicing the named ’861, ’212, ’002, ’879, ’806, ’741, and/or ’903 Patents.

COUNT I – INFRINGEMENT OF THE ’861 PATENT

76. Katana hereby realleges paragraphs 1 through 75 as though fully set forth herein.

77. Defendants directly and/or through its subsidiaries, affiliates, agents, and/or business partners, have in the past and continue to directly infringe at least claims 1-11, 16-20, 22, 24, and 25 of the ’861 Patent pursuant to 35 U.S.C. § 271(a) by making, using, selling, or offering

to sell, and/or importing integrated circuits devices that embody the inventions claimed in the '861 Patent, within the United States and this District.

78. On information and belief, the accused integrated circuit devices include a semiconductor device comprising a device separation region and an active region, the semiconductor device including a gate having a gate dielectric film and a side wall spacer, a source/drain, and a contact which is electrically coupled to the source/drain, wherein the active region is in contact with the gate dielectric film at a surface of the active region coincident with a first surface, a portion of the source/drain being located above the first surface; and wherein the contact is in contact with the source/drain at a source/drain surface defining a second surface, the second surface passing through a segment connecting a first point on the source/drain surface in contact with the device separation region to a second point on an edge of the source/drain surface in contact with the side wall spacer, constituting an angle with respect to the first surface.

79. On information and belief, the accused integrated circuit devices include a semiconductor device comprising a device separation region and an active region, the semiconductor device including: a gate having a side wall spacer and a gate dielectric film; a source/drain, said source/drain having a region above a first surface coincident with a surface of the active region, said source/drain having a source/drain surface in a second surface defined by a segment connecting a first point on the source/drain surface in contact with the device separation region to a second point on an edge of the source/drain surface in contact with the side wall spacer, said second surface being arranged at an angle with respect to the first surface, wherein a portion of the source/drain partially covers the device separation region; and a contact electrically coupled to the source/drain, wherein the active region is in contact with the gate dielectric film at the surface of the active region.

80. On information and belief, the accused integrated circuit devices include a semiconductor device, comprising: a gate dielectric film provided beneath a gate electrode on a substrate, said gate electrode and gate dielectric film sandwiched by a pair of vertical insulating film walls, said gate dielectric film and gate electrode having an equal width as viewed in a cross-sectional plane; and a pair of source/drains, each of the source/drains having a vertical face that meets a corresponding vertical insulating film wall so as to sandwich said gate dielectric film, gate electrode, and vertical insulating film walls therebetween, and having a first continuous angular face that slopes downward from a junction with its vertical face and corresponding vertical insulating film wall to a corresponding device separation region.

81. Defendants have been and are engaged in one or more of these direct infringing activities related to their integrated circuit devices having transistors and related structures manufactured using their 16nm FinFET process node, a representative example being the integrated circuit devices manufactured for Apple for resale as the Apple A9.

82. Defendants have been and are engaged in one or more of these direct infringing activities related to their integrated circuit devices having transistors and related structures manufactured using their 20nm process node, a representative example being the integrated circuit devices manufactured for Qualcomm for resale as the MDM9235M LTE modem.

83. Defendants have been and are engaged in one or more of these direct infringing activities related to their integrated circuit devices having transistors and related structures manufactured using their 28nm process node, a representative example being the integrated circuit devices manufactured for Qualcomm as the MDM9215M LTE Advanced modem.

84. Defendants have been and are engaged in one or more of these direct infringing activities related to their integrated circuit devices having transistors and related structures

manufactured using their 40nm process node, a representative example being the integrated circuit devices manufactured for Altera Strati as the Altera Stratix IV GX FPGA.

85. On information and belief, integrated circuit devices made using any of the 16nm, 20nm, 28nm, and/or 40nm process nodes infringe at least claims 1-11, 16-20, 22, 24, and 25 of the '861 Patent. Such infringing products are referred to hereinafter as the "'861 Accused Products."

86. Defendants, directly and/or through its subsidiaries, affiliates, agents, and/or business partners, have committed and continue to commit acts of indirect infringement, including at least claims 1-11, 16-20, 22, 24, and 25 of the '861 Patent pursuant to 35 U.S.C. §§ 271(b) and 271(c) by actively inducing or contributing to the acts of direct infringement performed by others in the United States, the State of Texas, and the Western District of Texas.

87. Defendants have actual notice of the '861 Patent and the infringement alleged herein at least as early as May 27, 2018.

88. On information and belief, Defendants have numerous lawyers and other active agents of Defendants and of its owned and controlled subsidiaries who regularly review patents and published patent applications relevant to technology in the fields of the Patents-in-Suit, specifically including patents directed to semiconductor devices issued to competitors such as Sharp, the original assignee of the '861 Patent.

89. On information and belief, the Defendants themselves have been issued over 30,000 patents worldwide held in the name of one of the Defendants or a related entity, many of which are patents prosecuted in the USPTO in the same technology area as the '861 Patent, giving Defendants intimate knowledge of the art in fields relevant to this civil action. The timing, circumstances and extent of Defendants obtaining actual knowledge of the '861 Patent prior to the commencement of this lawsuit will be confirmed during discovery.

90. Upon gaining knowledge of the '861 Patent, it was, or became, apparent to Defendants that the manufacture, sale, importing, offer for sale, and use of the '861 Accused Products results in infringement of the '861 Patent. On information and belief, Defendants have engaged and will continue to engage in activities constituting inducement of infringement, notwithstanding their knowledge, or willful blindness thereto, that the activities they induce result in infringement of the '861 Patent.

91. The '861 Accused Products are intended for integration into products known to be sold widely in the United States. Defendants make integrated circuit devices that embody the inventions claimed in the '861 Patent, which devices infringe when they are imported into, or sold, used, or offered for sale in the United States.

92. Defendants indirectly infringe by inducing customers (including fabless design companies) and other downstream parties (such as makers of mobile devices and other devices) to import products that incorporate integrated circuit devices embodying inventions claimed in the '861 Patent, or to sell or use such products, or offer them for sale, in the United States.

93. For example, Defendants induce fabless design companies, importers, resellers, and others who purchase or otherwise obtain devices manufactured at Defendants' overseas facilities to import devices embodying inventions recited in claims of the '861 Patent, or to sell or use such devices, or offer them for sale in the United States without authority.

94. Defendants encourage customers, resellers, or others to import into the United States and sell and use in the United States the '861 Accused Products with knowledge and the specific intent to cause the acts of direct infringement performed by these third parties.

95. On information and belief, after Defendants obtained knowledge of the '861 Patent, the '861 Accused Products have been and will continue to be imported into the United States and sold in large volumes by themselves and by others, such as customers, distributors, and resellers.

96. Defendants work closely with their customers in the process of finalizing circuit designs and planning for the preparation of masks to be used in the manufacturing process, so that these aspects of the manufacturing process are optimized for Defendants' process technologies and equipment. Defendants also offer their customers outsourced semiconductor testing/analysis, prototyping, mask services, and technical support services.

97. Defendants are aware that the '861 Accused Products are integral components of the products incorporating them, that the infringing integrated circuits are built into the products and cannot be removed or disabled by a purchaser of the products containing the infringing integrated circuit devices, such that Defendants' customers will infringe one or more claims of the '861 Patent by incorporating such integrated circuit devices in other products, and that subsequent importation, sale and use of such products in the United States would be a direct infringement of the '861 Patent. Therefore, Defendants are aware that their customers will infringe one or more claims of the '861 Patent by selling, offering for sale, importing, and/or using the products supplied by Defendants.

98. Defendants directly benefit from and actively and knowingly encourage customers', resellers', and users' importation of these products into the United States and sale and use within the United States. Defendants actively encourage customers, resellers, and downstream users to import, use, and sell in the United States the '861 Accused Products that they manufacture and supply, including through advertising, marketing, and sales activities directed at United States sales.

99. On information and belief, Defendants are aware of the size and importance of the United States market for customers of their products, and distribute or supply these products intended for importation, use, and sale in the United States. Defendants routinely market the '861 Accused Products to third parties for inclusion in products that are sold to customers in the United States. Defendant TSMC North America, Inc. provides a direct sales outlet for these products in the United States. Defendants' marketing efforts show that they have specifically intended to and have induced direct infringement in the United States.

100. Defendants have engaged and will continue to engage in additional activities to specifically target the United States market for the '861 Accused Products and actively induce manufacturers, importers, resellers, customers, and end users to directly infringe one or more claims of the '861 Patent in the United States.

101. For example, Defendants have showcased their semiconductor manufacturing capabilities and process technologies at least through written materials distributed in the United States and through the [www.tsmc.com](https://www.tsmc.com/english/dedicatedFoundry/technology/logic.htm) website in an effort to showcase their process technology, manufacturing, testing, and market applications, and to encourage customers to engage Defendants to produce integrated circuits for inclusion in the customers' devices and products. *See, e.g.,* <https://www.tsmc.com/english/dedicatedFoundry/technology/logic.htm> (last accessed December 6, 2019).

102. These materials target fabless design companies and integrated semiconductor device manufacturers and generally companies that make, use, offer to sell, sell, or import in the United States products that use integrated circuit devices such as those made by Defendants. Defendants derive significant revenue by selling the '861 Accused Products to third parties who directly infringe the '861 Patent in the United States.

103. Defendants' extensive sales and marketing efforts, sales volume, and partnerships all evidence their intent to induce companies to infringe one or more claims of the '861 Patent by using, offering to sell, selling, or importing products that incorporate the '861 Accused Products in the United States. Defendants have had specific intent to induce infringement or have been willfully blind to the direct infringement they are inducing.

104. On information and belief, Defendants have engaged and will continue to engage in activities constituting contributory infringement of the '861 Patent, including at least claims 1-11, 16-20, 22, 24, and 25 pursuant to 35 U.S.C. § 271(c).

105. Defendants contributorily infringe with knowledge that the '861 Accused Products, or the use thereof, infringe the '861 Patent. Defendants knowingly and intentionally contributed to the direct infringement of the '861 Patent by others by supplying these integrated circuit devices that embody a material part of the claimed invention of the '861 Patent, which are known by the Defendants to be specially made or adapted for use in an infringing manner. For example, and without limitation, the '861 Accused Products are used in various end products, such as computers, networking gear, and mobile devices.

106. The '861 Accused Products are not staple articles or commodities of commerce suitable for non-infringing use and are especially made for or adapted for use in infringing the '861 Patent.

107. There are no substantial uses of the '861 Accused Products that do not infringe the '861 Patent.

108. By contributing a material part of the infringing computing products sold, offered for sale, imported, and used by their customers, resellers, and users, Defendants have been and are now indirectly infringing the '861 Patent under 35 U.S.C. § 271(c).

109. Defendants' direct and indirect infringement of the '861 Patent has injured Katana, and Katana is entitled to recover damages adequate to compensate for such infringement pursuant to 35 U.S.C. § 284. Unless they cease their infringing activities, Defendants will continue to injure Katana by infringing the '861 Patent.

110. On information and belief, Defendants acted egregiously and with willful misconduct in that their actions constituted direct or indirect infringement of a valid patent, and this was either known or so obvious that Defendants should have known about it. Defendants continue to infringe the '861 Patent by making, using, selling, offering for sale, and importing in the United States the '861 Accused Products, and to induce the direct infringement of others performing these acts, or they have acted at least in reckless disregard of Katana's patent rights.

111. On information and belief, Defendants will continue their infringement notwithstanding actual knowledge of the '861 Patent and without a good faith basis to believe that their activities do not infringe any valid claim of the '861 Patent. All infringement of the '861 Patent following Defendants' knowledge of the '861 Patent is willful, and Katana is entitled to treble damages and attorneys' fees and costs incurred in this action under 35 U.S.C. §§ 284 and 285.

112. Katana has incurred and will continue to incur substantial damages, including monetary damages.

113. Katana has been and continues to be irreparably harmed by Defendants' infringement of the '861 Patent.

114. Therefore, Katana is entitled to an injunction, actual and/or compensatory damages, reasonable royalties, pre-judgment and post-judgment interest, enhanced damages, and costs.

COUNT II – INFRINGEMENT OF THE '212 PATENT

115. Katana hereby realleges paragraphs 1 through 114 as though fully set forth herein.

116. Defendants directly and/or through its subsidiaries, affiliates, agents, and/or business partners, have in the past and continue to directly infringe at least claims 4, 6, and 8 of the '212 Patent pursuant to 35 U.S.C. §§ 271(a) by making, using, selling, or offering to sell, and/or importing integrated circuits devices that embody the inventions claimed in the '212 Patent, within the United States and this District.

117. On information and belief, the accused integrated circuit devices include a semiconductor device comprising a gate insulating film and a gate electrode stacked in this order on a substrate or well region of first conductive type, sidewall insulating films disposed on side surfaces of the gate electrode, a channel region formed in the semiconductor substrate or well region beneath the gate electrode, and source/drain regions of second conductive type elevated to above the semiconductor substrate or well region from both sides of the channel region, the source/drain regions being electrically isolated from the gate electrode by the gate insulating film and the sidewall insulating films, characterized in that: the semiconductor substrate or well region has diffusion regions of the first conductive type formed between the source/drain regions and the channel region, the diffusion regions having an impurity concentration higher than that of the semiconductor substrate or well region.

118. Defendants have been and are engaged in one or more of these direct infringing activities related to their integrated circuit devices having transistors and related structures manufactured using their 20nm process node, a representative example being the integrated circuit devices manufactured for Qualcomm for resale as the MDM9235M LTE modem.

119. Defendants have been and are engaged in one or more of these direct infringing activities related to their integrated circuit devices having transistors and related structures

manufactured using their 28nm process node, a representative example being the integrated circuit devices manufactured for Qualcomm as the MDM9215M LTE Advanced modem.

120. On information and belief, integrated circuit devices made using any of the 20nm and/or 28nm process nodes infringe at least claims 4, 6, and 8 of the '212 Patent. Such infringing products are referred to hereinafter as the "'212 Accused Products."

121. Defendants, directly and/or through its subsidiaries, affiliates, agents, and/or business partners, have committed and continue to commit acts of indirect infringement, including at least claims 4, 6, and 8 of the '212 Patent pursuant to 35 U.S.C. §§ 271(b) and 271(c) by actively inducing or contributing to the acts of direct infringement performed by others in the United States, the State of Texas, and the Western District of Texas.

122. Defendants have actual notice of the '212 Patent and the infringement alleged herein at least as early as May 27, 2018.

123. On information and belief, Defendants have numerous lawyers and other active agents of Defendants and of its owned and controlled subsidiaries who regularly review patents and published patent applications relevant to technology in the fields of the Patents-in-Suit, specifically including patents directed to semiconductor devices issued to competitors such as Sharp, the original assignee of the '212 Patent.

124. On information and belief, the Defendants themselves have been issued over 30,000 patents worldwide held in the name of one of the Defendants or a related entity, many of which are patents prosecuted in the USPTO in the same technology area as the '212 Patent, giving Defendants intimate knowledge of the art in fields relevant to this civil action. The timing, circumstances, and extent of Defendants obtaining actual knowledge of the '212 Patent prior to the commencement of this lawsuit will be confirmed during discovery.

125. Upon gaining knowledge of the '212 Patent, it was, or became, apparent to Defendants that the manufacture, sale, importing, offer for sale, and use of the '212 Accused Products results in infringement of the '212 Patent. On information and belief, Defendants have engaged and will continue to engage in activities constituting inducement of infringement, notwithstanding their knowledge, or willful blindness thereto, that the activities they induce result in infringement of the '212 Patent.

126. The '212 Accused Products are intended for integration into products known to be sold widely in the United States. Defendants make integrated circuit devices that embody the inventions claimed in the '212 Patent, which devices infringe when they are imported into, or sold, used, or offered for sale in the United States.

127. Defendants indirectly infringe by inducing customers (including fabless design companies) and other downstream parties (such as makers of mobile devices and other devices) to import products that incorporate integrated circuit devices embodying inventions claimed in the '861 Patent, or to sell or use such products, or offer them for sale, in the United States.

128. For example, Defendants induce fabless design companies, importers, resellers, and others who purchase or otherwise obtain devices manufactured at Defendants' overseas facilities to import devices embodying inventions recited in claims of the '212 Patent, or to sell or use such devices, or offer them for sale in the United States without authority.

129. Defendants encourage customers, resellers, or others to import into the United States and sell and use in the United States the '212 Accused Products with knowledge and the specific intent to cause the acts of direct infringement performed by these third parties.

130. On information and belief, after Defendants obtained knowledge of the '212 Patent, the '212 Accused Products have been and will continue to be imported into the United States and sold in large volumes by themselves and by others, such as customers, distributors, and resellers.

131. Defendants work closely with their customers in the process of finalizing circuit designs and planning for the preparation of masks to be used in the manufacturing process, so that these aspects of the manufacturing process are optimized for Defendants' process technologies and equipment. Defendants also offer their customers outsourced semiconductor testing/analysis, prototyping, mask services, and technical support services.

132. Defendants are aware that the '212 Accused Products are integral components of the products incorporating them, that the infringing integrated circuits are built into the products and cannot be removed or disabled by a purchaser of the products containing the infringing integrated circuit devices, such that Defendants' customers will infringe one or more claims of the '212 Patent by incorporating such integrated circuit devices in other products, and that subsequent importation, sale and use of such products in the United States would be a direct infringement of the '212 Patent. Therefore, Defendants are aware that their customers will infringe one or more claims of the '212 Patent by selling, offering for sale, importing, and/or using the products supplied by Defendants.

133. Defendants directly benefit from and actively and knowingly encourage customers', resellers', and users' importation of these products into the United States and sale and use within the United States. Defendants actively encourage customers, resellers, and downstream users to import, use, and sell in the United States the '212 Accused Products that they manufacture and supply, including through advertising, marketing, and sales activities directed at United States sales.

134. On information and belief, Defendants are aware of the size and importance of the United States market for customers of their products, and distribute or supply these products intended for importation, use, and sale in the United States. Defendants routinely market the '212 Accused Products to third parties for inclusion in products that are sold to customers in the United States. Defendant TSMC North Americas, Inc. provides a direct sales outlet for these products in the United States. Defendants' marketing efforts show that they have specifically intended to and have induced direct infringement in the United States.

135. Defendants have engaged and will continue to engage in additional activities to specifically target the United States market for the '212 Accused Products and actively induce manufacturers, importers, resellers, customers, and end users to directly infringe one or more claims of the '212 Patent in the United States.

136. For example, Defendants have showcased their semiconductor manufacturing capabilities and process technologies at least through written materials distributed in the United States and through the www.tsmc.com website in an effort to showcase their process technology, manufacturing, testing, and market applications, and to encourage customers to engage Defendants to produce integrated circuits for inclusion in the customers' devices and products. *See, e.g.,* <https://www.tsmc.com/english/dedicatedFoundry/technology/logic.htm> (last accessed December 6, 2019).

137. These materials target fabless design companies and integrated semiconductor device manufacturers and generally companies that make, use, offer to sell, sell, or import in the United States products that use integrated circuit devices such as those made by Defendants. Defendants derive significant revenue by selling the '212 Accused Products to third parties who directly infringe the '212 Patent in the United States.

138. Defendants' extensive sales and marketing efforts, sales volume, and partnerships all evidence their intent to induce companies to infringe one or more claims of the '212 Patent by using, offering to sell, selling, or importing products that incorporate the '212 Accused Products in the United States. Defendants have had specific intent to induce infringement or have been willfully blind to the direct infringement they are inducing.

139. On information and belief, Defendants have engaged and will continue to engage in activities constituting contributory infringement of the '212 Patent, including at least claims 4, 6, and 8 pursuant to 35 U.S.C. § 271(c).

140. Defendants contributorily infringe with knowledge that the '212 Accused Products, or the use thereof, infringe the '212 Patent. Defendants knowingly and intentionally contributed to the direct infringement of the '212 Patent by others by supplying these integrated circuit devices that embody a material part of the claimed invention of the '212 Patent, which are known by the Defendants to be specially made or adapted for use in an infringing manner. For example, and without limitation, the '212 Accused Products are used in various end products, such as computers, networking gear, and mobile devices.

141. The '212 Accused Products are not staple articles or commodities of commerce suitable for non-infringing use and are especially made for or adapted for use in infringing the '212 Patent.

142. There are no substantial uses of the '212 Accused Products that do not infringe the '212 Patent.

143. By contributing a material part of the infringing computing products sold, offered for sale, imported, and used by their customers, resellers, and users, Defendants have been and are now indirectly infringing the '212 Patent under 35 U.S.C. § 271(c).

144. Defendants' direct and indirect infringement of the '212 Patent has injured Katana, and Katana is entitled to recover damages adequate to compensate for such infringement pursuant to 35 U.S.C. § 284. Unless they cease their infringing activities, Defendants will continue to injure Katana by infringing the '212 Patent.

145. On information and belief, Defendants acted egregiously and with willful misconduct in that their actions constituted direct or indirect infringement of a valid patent, and this was either known or so obvious that Defendants should have known about it. Defendants continue to infringe the '212 Patent by making, using, selling, offering for sale, and importing in the United States the '212 Accused Products, and to induce the direct infringement of others performing these acts, or they have acted at least in reckless disregard of Katana's patent rights.

146. On information and belief, Defendants will continue their infringement notwithstanding actual knowledge of the '212 Patent and without a good faith basis to believe that their activities do not infringe any valid claim of the '212 Patent. All infringement of the '212 Patent following Defendants' knowledge of the '212 Patent is willful, and Katana is entitled to treble damages and attorneys' fees and costs incurred in this action under 35 U.S.C. §§ 284 and 285.

147. Katana has incurred and will continue to incur substantial damages, including monetary damages.

148. Katana has been and continues to be irreparably harmed by Defendants' infringement of the '212 Patent.

149. Therefore, Katana is entitled to an injunction, actual and/or compensatory damages, reasonable royalties, pre-judgment and post-judgment interest, enhanced damages, and costs.

COUNT III – INFRINGEMENT OF THE '002 PATENT

150. Katana hereby realleges paragraphs 1 through 149 as though fully set forth herein.

151. Defendants directly and/or through its subsidiaries, affiliates, agents, and/or business partners, have in the past and continue to directly infringe at least claims 1-3, 7-9, 13, and 14 of the '002 Patent pursuant to 35 U.S.C. §§ 271(a) by making, using, selling, or offering to sell, and/or importing integrated circuits devices that embody the inventions claimed in the '002 Patent, within the United States and this District.

152. On information and belief, the accused integrated circuit devices include a semiconductor device which comprises: an insulative substrate having a layer of interconnection patterns formed on a chip-side surface thereof and external terminals formed on a surface thereof opposite from the chip-side surface; and a plurality of semiconductor chips stacked on the chip-side surface of the insulative substrate and each electrically connected to corresponding interconnection patterns; wherein, among the plurality of semiconductor chips, a semiconductor chip having the largest plan surface area has the greatest thickness.

153. On information and belief, the accused integrated circuit devices include a semiconductor device which comprises: an insulative substrate having a layer of interconnection patterns formed on a chip-side surface thereof and external terminals formed on a surface thereof opposite from the chip-side surface; and a plurality of semiconductor chips stacked on the chip-side surface of the insulative substrate and each electrically connected to corresponding interconnection patterns; wherein, a first of said semiconductor chips has a plan surface area larger than a plan surface area of a second of said plurality of semiconductor chips, said first semiconductor chip having a thickness greater than said second semiconductor chip.

154. Defendants have been and are engaged in one or more of these direct infringing activities related to their integrated circuit devices manufactured, at least in part, via its InFO wafer

level packaging technology, a representative example being the integrated circuit devices manufactured for Apple for resale as the Apple A10 and Apple A11.

155. On information and belief, integrated circuit devices made using the InFO wafer level packaging technology infringe at least claims 1-3, 7-9, 13, and 14 of the '002 Patent. Such infringing products are referred to hereinafter as the "'002 Accused Products."

156. Defendants, directly and/or through its subsidiaries, affiliates, agents, and/or business partners, have committed and continue to commit acts of indirect infringement, including at least claims 1-3, 7-9, 13, and 14 of the '002 Patent pursuant to 35 U.S.C. §§ 271(b) and 271(c) by actively inducing or contributing to the acts of direct infringement performed by others in the United States, the State of Texas, and the Western District of Texas.

157. Defendants have actual notice of the '002 Patent and the infringement alleged herein at least as early as August 22, 2018.

158. On information and belief, Defendants have numerous lawyers and other active agents of Defendants and of its owned and controlled subsidiaries who regularly review patents and published patent applications relevant to technology in the fields of the Patents-in-Suit, specifically including patents directed to semiconductor devices issued to competitors such as Sharp, the original assignee of the '002 Patent.

159. On information and belief, the Defendants themselves have been issued over 30,000 patents worldwide held in the name of one of the Defendants or a related entity, many of which are patents prosecuted in the USPTO in the same technology area as the '002 Patent, giving Defendants intimate knowledge of the art in fields relevant to this civil action. The timing, circumstances and extent of Defendants obtaining actual knowledge of the '002 Patent prior to the commencement of this lawsuit will be confirmed during discovery.

160. Upon gaining knowledge of the '002 Patent, it was, or became, apparent to Defendants that the manufacture, sale, importing, offer for sale, and use of the '002 Accused Products results in infringement of the '002 Patent. On information and belief, Defendants have engaged and will continue to engage in activities constituting inducement of infringement, notwithstanding their knowledge, or willful blindness thereto, that the activities they induce result in infringement of the '002 Patent.

161. The '002 Accused Products are intended for integration into products known to be sold widely in the United States. Defendants make integrated circuit devices that embody the inventions claimed in the '002 Patent, which devices infringe when they are imported into, or sold, used, or offered for sale in the United States.

162. Defendants indirectly infringe by inducing customers (including fabless design companies) and other downstream parties (such as makers of mobile devices and other devices) to import products that incorporate integrated circuit devices embodying inventions claimed in the '002 Patent, or to sell or use such products, or offer them for sale, in the United States.

163. For example, Defendants induce fabless design companies, importers, resellers, and others who purchase or otherwise obtain devices manufactured at Defendants' overseas facilities to import devices embodying inventions recited in claims of the '002 Patent, or to sell or use such devices, or offer them for sale in the United States without authority.

164. Defendants encourage customers, resellers, or others to import into the United States and sell and use in the United States the '002 Accused Products with knowledge and the specific intent to cause the acts of direct infringement performed by these third parties.

165. On information and belief, after Defendants obtained knowledge of the '002 Patent, the '002 Accused Products have been and will continue to be imported into the United States and sold in large volumes by themselves and by others, such as customers, distributors, and resellers.

166. Defendants work closely with their customers in the process of finalizing circuit designs and planning for the preparation of masks to be used in the manufacturing process, so that these aspects of the manufacturing process are optimized for Defendants' process technologies and equipment. Defendants also offer their customers outsourced semiconductor testing/analysis, prototyping, mask services, and technical support services.

167. Defendants are aware that the '002 Accused Products are integral components of the products incorporating them, that the infringing integrated circuits are built into the products and cannot be removed or disabled by a purchaser of the products containing the infringing integrated circuit devices, such that Defendants' customers will infringe one or more claims of the '002 Patent by incorporating such integrated circuit devices in other products, and that subsequent importation, sale and use of such products in the United States would be a direct infringement of the '002 Patent. Therefore, Defendants are aware that their customers will infringe one or more claims of the '002 Patent by selling, offering for sale, importing, and/or using the products supplied by Defendants.

168. Defendants directly benefit from and actively and knowingly encourage customers', resellers', and users' importation of these products into the United States and sale and use within the United States. Defendants actively encourage customers, resellers, and downstream users to import, use, and sell in the United States the '002 Accused Products that they manufacture and supply, including through advertising, marketing, and sales activities directed at United States sales.

169. On information and belief, Defendants are aware of the size and importance of the United States market for customers of their products, and also distribute or supply these products intended for importation, use, and sale in the United States. Defendants routinely market the '002 Accused Products to third parties for inclusion in products that are sold to customers in the United States. Defendant TSMC North America, Inc. provides a direct sales outlet for these products in the United States. Defendants' marketing efforts show that they have specifically intended to and have induced direct infringement in the United States.

170. Defendants have engaged and will continue to engage in additional activities to specifically target the United States market for the '002 Accused Products and actively induce manufacturers, importers, resellers, customers, and end users to directly infringe one or more claims of the '002 Patent in the United States.

171. For example, Defendants have showcased their semiconductor manufacturing capabilities and process technologies at least through written materials distributed in the United States and through the [www.tsmc.com](https://www.tsmc.com/english/dedicatedFoundry/services/info.htm) website in an effort to showcase their process technology, manufacturing, testing, and market applications, and to encourage customers to engage Defendants to produce integrated circuits for inclusion in the customers' devices and products. *See, e.g.,* <https://www.tsmc.com/english/dedicatedFoundry/services/info.htm> (last accessed December 6, 2019).

172. These materials target fabless design companies and integrated semiconductor device manufacturers and generally companies that make, use, offer to sell, sell, or import in the United States products that use integrated circuit devices such as those made by Defendants. Defendants derive significant revenue by selling the '002 Accused Products to third parties who directly infringe the '002 Patent in the United States.

173. Defendants' extensive sales and marketing efforts, sales volume, and partnerships all evidence their intent to induce companies to infringe one or more claims of the '002 Patent by using, offering to sell, selling, or importing products that incorporate the '002 Accused Products in the United States. Defendants have had specific intent to induce infringement or have been willfully blind to the direct infringement they are inducing.

174. On information and belief, Defendants have engaged and will continue to engage in activities constituting contributory infringement of the '002 Patent, including at least claims 1-3, 7-9, 13, and 14 pursuant to 35 U.S.C. § 271(c).

175. Defendants contributorily infringe with knowledge that the '002 Accused Products, or the use thereof, infringe the '002 Patent. Defendants knowingly and intentionally contributed to the direct infringement of the '002 Patent by others by supplying these integrated circuit devices that embody a material part of the claimed invention of the '002 Patent, which are known by the Defendants to be specially made or adapted for use in an infringing manner. For example, and without limitation, the '002 Accused Products are used in various end products, such as computers, networking gear, and mobile devices.

176. The '002 Accused Products are not staple articles or commodities of commerce suitable for non-infringing use and are especially made for or adapted for use in infringing the '002 Patent.

177. There are no substantial uses of the '002 Accused Products that do not infringe the '002 Patent.

178. By contributing a material part of the infringing computing products sold, offered for sale, imported, and used by their customers, resellers, and users, Defendants have been and are now indirectly infringing the '002 Patent under 35 U.S.C. § 271(c).

179. Defendants' direct and indirect infringement of the '002 Patent has injured Katana, and Katana is entitled to recover damages adequate to compensate for such infringement pursuant to 35 U.S.C. § 284. Unless they cease their infringing activities, Defendants will continue to injure Katana by infringing the '002 Patent.

180. On information and belief, Defendants acted egregiously and with willful misconduct in that their actions constituted direct or indirect infringement of a valid patent, and this was either known or so obvious that Defendants should have known about it. Defendants continue to infringe the '002 Patent by making, using, selling, offering for sale, and importing in the United States the '002 Accused Products, and to induce the direct infringement of others performing these acts, or they have acted at least in reckless disregard of Katana's patent rights.

181. On information and belief, Defendants will continue their infringement notwithstanding actual knowledge of the '002 Patent and without a good faith basis to believe that their activities do not infringe any valid claim of the '002 Patent. All infringement of the '002 Patent following Defendants' knowledge of the '002 Patent is willful, and Katana is entitled to treble damages and attorneys' fees and costs incurred in this action under 35 U.S.C. §§ 284 and 285.

182. Katana has incurred and will continue to incur substantial damages, including monetary damages.

183. Katana has been and continues to be irreparably harmed by Defendants' infringement of the '002 Patent.

184. Therefore, Katana is entitled to an injunction, actual and/or compensatory damages, reasonable royalties, pre-judgment and post-judgment interest, enhanced damages, and costs.

COUNT IV – INFRINGEMENT OF THE '879 PATENT

185. Katana hereby realleges paragraphs 1 through 184 as though fully set forth herein.

186. Defendants directly and/or through its subsidiaries, affiliates, agents, and/or business partners, have in the past and continue to directly infringe at least claims 1, 2, and 15 of the '879 Patent pursuant to 35 U.S.C. §§ 271(a) and 271(g) by making, using, selling, or offering to sell, and/or importing integrated circuits devices made by practicing and by performing processes that practice the inventions claimed in the '879 Patent, within the United States and this District.

187. On information and belief, the method of manufacturing the accused integrated circuit devices comprises of: (a) forming a first adhesion layer on a back surface of a first wafer on which no circuit is formed, a circuit being formed on a front surface of the first wafer; (b) producing separate first semiconductor chips from said first wafer by dicing; (c) mounting said first semiconductor chip on a wiring layer with its back surface facing said wiring layer; (d) forming a second adhesion layer on a back surface of a second wafer on which no circuit is formed, a circuit being formed on a front surface of the first wafer; (e) producing separate second semiconductor chips from said second wafer by dicing; and (f) mounting said second semiconductor chip on said first semiconductor chip with its back surface facing said first semiconductor chip.

188. On information and belief, the method of manufacturing the accused integrated circuit devices comprises of: (a) forming an insulating layer and a metal bump on a wiring layer; (b) mounting a first semiconductor chip on said wiring layer with its circuit-formed surface facing said wiring layer; (c) forming an adhesion layer on a back surface of a wafer on which no circuit is formed, whereby a circuit is formed on a front surface of the wafer; (d) producing separate second semiconductor chips from the wafer by dicing; (e) mounting said second semiconductor

chip on said first semiconductor chip with the back surface of the second semiconductor chip facing said first semiconductor chip; (f) wire-bonding an electrode section of said second semiconductor chip to an electrode section of said wiring layer with a wire; and (g) sealing said first and second semiconductor chips and said wire.

189. On information and belief, the method of manufacturing the accused integrated circuit devices comprises of: (a) forming a first adhesion layer on a back surface of a first wafer, no circuit being formed on the back surface of the first wafer; (b) producing separate first semiconductor chips from said first wafer by dicing; (c) mounting at least one of said first semiconductor chips on a wiring layer with the back surface of the at least one first semiconductor chip facing said wiring layer; (d) forming a second adhesion layer on a back surface of a second wafer, no circuit being formed on the back surface of the second wafer; (e) producing separate second semiconductor chips from said second wafer by dicing; and (f) mounting at least one of said second semiconductor chips on said at least one of said first semiconductor chip with the back surface of the at least one second semiconductor chip facing said at least one of said first semiconductor chips.

190. Defendants have been and are engaged in one or more of these direct infringing activities related to their integrated circuit devices manufactured, at least in part, via its InFO wafer level packaging technology, a representative example being the integrated circuit devices manufactured for Apple for resale as the Apple A11.

191. On information and belief, integrated circuit devices made using the InFO wafer level packaging technology infringe at least claims 1, 2, and 15 of the '879 Patent. Such infringing products are referred to hereinafter as the "'879 Accused Products."

192. Defendants, directly and/or through its subsidiaries, affiliates, agents, and/or business partners, have committed and continue to commit acts of indirect infringement, including at least claims 1, 2, and 15 of the '879 Patent pursuant to 35 U.S.C. §§ 271(b) and 271(c) by actively inducing or contributing to the acts of direct infringement performed by others in the United States, the State of Texas, and the Western District of Texas.

193. Defendants have actual notice of the '879 Patent and the infringement alleged herein at least as early as December 30, 2018.

194. On information and belief, Defendants have numerous lawyers and other active agents of Defendants and of its owned and controlled subsidiaries who regularly review patents and published patent applications relevant to technology in the fields of the Patents-in-Suit, specifically including patents directed to semiconductor devices issued to competitors such as Sharp, the original assignee of the '879 Patent.

195. On information and belief, the Defendants themselves have been issued over 30,000 patents worldwide held in the name of one of the Defendants or a related entity, many of which are patents prosecuted in the USPTO in the same technology area as the '879 Patent, giving Defendants intimate knowledge of the art in fields relevant to this civil action. The timing, circumstances and extent of Defendants obtaining actual knowledge of the '879 Patent prior to the commencement of this lawsuit will be confirmed during discovery.

196. Upon gaining knowledge of the '879 Patent, it was, or became, apparent to Defendants that the manufacture, sale, importing, offer for sale, and use of the '879 Accused Products results in infringement of the '879 Patent. On information and belief, Defendants have engaged and will continue to engage in activities constituting inducement of infringement,

notwithstanding their knowledge, or willful blindness thereto, that the activities they induce result in infringement of the '879 Patent.

197. The '879 Accused Products are intended for integration into products known to be sold widely in the United States. Defendants make integrated circuit devices that embody the inventions claimed in the '879 Patent, which devices infringe when they are imported into, or sold, used, or offered for sale in the United States.

198. Defendants indirectly infringe by inducing customers (including fabless design companies) and other downstream parties (such as makers of mobile devices and other devices) to import products that incorporate integrated circuit devices embodying inventions claimed in the '879 Patent, or to sell or use such products, or offer them for sale, in the United States.

199. For example, Defendants induce fabless design companies, importers, resellers, and others who purchase or otherwise obtain devices manufactured at Defendants' overseas facilities to import devices embodying inventions recited in claims of the '879 Patent, or to sell or use such devices, or offer them for sale in the United States without authority.

200. Defendants encourage customers, resellers, or others to import into the United States and sell and use in the United States the '879 Accused Products with knowledge and the specific intent to cause the acts of direct infringement performed by these third parties.

201. On information and belief, after Defendants obtained knowledge of the '879 Patent, the '879 Accused Products have been and will continue to be imported into the United States and sold in large volumes by themselves and by others, such as customers, distributors, and resellers.

202. Defendants work closely with their customers in the process of finalizing circuit designs and planning for the preparation of masks to be used in the manufacturing process, so that these aspects of the manufacturing process are optimized for Defendants' process technologies and

equipment. Defendants also offer their customers outsourced semiconductor testing/analysis, prototyping, mask services, and technical support services.

203. Defendants are aware that the '879 Accused Products are integral components of the products incorporating them, that the infringing integrated circuits are built into the products and cannot be removed or disabled by a purchaser of the products containing the infringing integrated circuit devices, such that Defendants' customers will infringe one or more claims of the '879 Patent by incorporating such integrated circuit devices in other products, and that subsequent importation, sale and use of such products in the United States would be a direct infringement of the '879 Patent. Therefore, Defendants are aware that their customers will infringe one or more claims of the '879 Patent by selling, offering for sale, importing, and/or using the products supplied by Defendants.

204. Defendants directly benefit from and actively and knowingly encourage customers', resellers', and users' importation of these products into the United States and sale and use within the United States. Defendants actively encourage customers, resellers, and downstream users to import, use, and sell in the United States the '879 Accused Products that they manufacture and supply, including through advertising, marketing, and sales activities directed at United States sales.

205. On information and belief, Defendants are aware of the size and importance of the United States market for customers of their products, and distribute or supply these products intended for importation, use, and sale in the United States. Defendants routinely market their infringing the '879 Accused Products to third parties for inclusion in products that are sold to customers in the United States. Defendant TSMC North America, Inc. provides a direct sales outlet

for these products in the United States. Defendants' marketing efforts show that they have specifically intended to and have induced direct infringement in the United States.

206. Defendants have engaged and will continue to engage in additional activities to specifically target the United States market for the '879 Accused Products and actively induce manufacturers, importers, resellers, customers, and end users to directly infringe one or more claims of the '879 Patent in the United States.

207. For example, Defendants have showcased their semiconductor manufacturing capabilities and process technologies at least through written materials distributed in the United States and through the [www.tsmc.com](https://www.tsmc.com/english/dedicatedFoundry/services/info.htm) website in an effort to showcase their process technology, manufacturing, testing, and market applications, and to encourage customers to engage Defendants to produce integrated circuits for inclusion in the customers' devices and products. *See, e.g.,* <https://www.tsmc.com/english/dedicatedFoundry/services/info.htm> (last accessed December 6, 2019).

208. These materials target fabless design companies and integrated semiconductor device manufacturers and generally companies that make, use, offer to sell, sell, or import in the United States products that use integrated circuit devices such as those made by Defendants. Defendants derive significant revenue by selling the '879 Accused Products to third parties who directly infringe the '879 Patent in the United States.

209. Defendants' extensive sales and marketing efforts, sales volume, and partnerships all evidence their intent to induce companies to infringe one or more claims of the '879 Patent by using, offering to sell, selling, or importing products that incorporate the '879 Accused Products in the United States. Defendants have had specific intent to induce infringement or have been willfully blind to the direct infringement they are inducing.

210. On information and belief, Defendants have engaged and will continue to engage in activities constituting contributory infringement of the '879 Patent, including at least claims 1, 2, and 15 pursuant to 35 U.S.C. § 271(c).

211. Defendants contributorily infringe with knowledge that the '879 Accused Products, or the use thereof, infringe the '879 Patent. Defendants knowingly and intentionally contributed to the direct infringement of the '879 Patent by others by supplying these integrated circuit devices that embody a material part of the claimed invention of the '879 Patent, which are known by the Defendants to be specially made or adapted for use in an infringing manner. For example, and without limitation, the '879 Accused Products are used in various end products, such as computers, networking gear, and mobile devices.

212. The '879 Accused Products are not staple articles or commodities of commerce suitable for non-infringing use and are especially made for or adapted for use in infringing the '879 Patent.

213. There are no substantial uses of the '879 Accused Products that do not infringe the '879 Patent.

214. By contributing a material part of the infringing computing products sold, offered for sale, imported, and used by their customers, resellers, and users, Defendants have been and are now indirectly infringing the '879 Patent under 35 U.S.C. § 271(c).

215. Defendants' direct and indirect infringement of the '879 Patent has injured Katana, and Katana is entitled to recover damages adequate to compensate for such infringement pursuant to 35 U.S.C. § 284. Unless they cease their infringing activities, Defendants will continue to injure Katana by infringing the '879 Patent.

216. On information and belief, Defendants acted egregiously and with willful misconduct in that their actions constituted direct or indirect infringement of a valid patent, and this was either known or so obvious that Defendants should have known about it. Defendants continue to infringe the '879 Patent by making, using, selling, offering for sale, and importing in the United States the '879 Accused Products, and to induce the direct infringement of others performing these acts, or they have acted at least in reckless disregard of Katana's patent rights.

217. On information and belief, Defendants will continue their infringement notwithstanding actual knowledge of the '879 Patent and without a good faith basis to believe that their activities do not infringe any valid claim of the '879 Patent. All infringement of the '879 Patent following Defendants' knowledge of the '879 Patent is willful, and Katana is entitled to treble damages and attorneys' fees and costs incurred in this action under 35 U.S.C. §§ 284 and 285.

218. Katana has incurred and will continue to incur substantial damages, including monetary damages.

219. Katana has been and continues to be irreparably harmed by Defendants' infringement of the '879 Patent.

220. Therefore, Katana is entitled to an injunction, actual and/or compensatory damages, reasonable royalties, pre-judgment and post-judgment interest, enhanced damages, and costs.

COUNT V – INFRINGEMENT OF THE '806 PATENT

221. Katana hereby realleges paragraphs 1 through 220 as though fully set forth herein. Defendants directly and/or through its subsidiaries, affiliates, agents, and/or business partners, have in the past and continue to directly infringe at least claims 1, 12, 23, and 30 of the '806 Patent pursuant to 35 U.S.C. §§ 271(a) and 271(g) by making, using, selling, or offering to sell, and/or

importing integrated circuits devices made by practicing and by performing processes that practice the inventions claimed in the '806 Patent, within the United States and this District.

222. On information and belief, the accused integrated circuit devices include a semiconductor device including a stacked package structure and a chip size package structure, comprising: an insulating substrate including a wiring layer having electrode sections; a first semiconductor chip having a first adhesion layer adhered to its back surface where a circuit is not formed, said first semiconductor chip being mounted on said wiring layer through the first insulating adhesion layer; and a second semiconductor chip having a second adhesion layer adhered to its back surface where a circuit is not formed, said second semiconductor chip being mounted on a circuit-formed front surface of said first semiconductor chip through the second insulating adhesion layer; each of said first and second semiconductor chips being wire-bonded to the electrode section with a wire, said first and second semiconductor chips and the wire being sealed with a resin.

223. On information and belief, the accused integrated circuit devices include a semiconductor device comprising: an insulating substrate including a wiring layer on its surface and a packaging-use external terminal on its back surface, the wiring layer having an electrode section, the packaging-use external terminal being electrically connected to said wiring layer through a via hole; a first semiconductor chip produced by forming a first adhesion layer on a back surface of a wafer having a desired circuit formed on its front surface and by dicing the wafer, said first semiconductor chip being mounted on said insulating substrate through the first adhesion layer; and a second semiconductor chip produced by forming a second adhesion layer on a back surface of a wafer having a circuit formed on its front surface and by dicing the wafer, said second semiconductor chip being mounted on a circuit-formed surface of said first semiconductor chip

through the second adhesion layer; said first and second semiconductor chips being connected to the electrode section of the wiring layer with a wire, said first and second semiconductor chips and the wire being sealed with a resin.

224. On information and belief, the method of manufacturing the accused integrated circuit devices comprises of: (a) forming a first insulating adhesion layer on a back surface of a first wafer having a circuit formed on its front surface; (b) producing separate first semiconductor chips from said first wafer by dicing; (c) mounting said first semiconductor chip on a wiring layer with its back surface facing said wiring layer; (d) forming a second insulating adhesion layer on a back surface of a second wafer having a circuit formed on its front surface; (e) producing separate second semiconductor chips from said second wafer by dicing; (f) mounting said second semiconductor chip on said first semiconductor chip with its back surface facing said first semiconductor chip; (g) wire-bonding said first semiconductor chip to an electrode section of said wiring layer with a wire; (h) wire-bonding said second semiconductor chip to an electrode section of said wiring layer with a wire; and (i) sealing said first and second semiconductor chips and the wires.

225. Defendants have been and are engaged in one or more of these direct infringing activities related to their integrated circuit devices manufactured, at least in part, via its InFO wafer level packaging technology, a representative example being the integrated circuit devices manufactured for Apple for resale as the Apple A11.

226. On information and belief, integrated circuit devices made using the InFO wafer level packaging technology infringe at least claims 1, 12, 23, and 30 of the '806 Patent. Such infringing products are referred to hereinafter as the "'806 Accused Products."

227. Defendants, directly and/or through its subsidiaries, affiliates, agents, and/or business partners, have committed and continue to commit acts of indirect infringement, including at least claims 1, 12, 23, and 30 of the '806 Patent pursuant to 35 U.S.C. §§ 271(b) and 271(c) by actively inducing or contributing to the acts of direct infringement performed by others in the United States, the State of Texas, and the Western District of Texas.

228. Defendants have actual notice of the '806 Patent and the infringement alleged herein at least as early as August 22, 2018.

229. On information and belief, Defendants have numerous lawyers and other active agents of Defendants and of its owned and controlled subsidiaries who regularly review patents and published patent applications relevant to technology in the fields of the Patents-in-Suit, specifically including patents directed to semiconductor devices issued to competitors such as Sharp, the original assignee of the '806 Patent.

230. On information and belief, the Defendants themselves have been issued over 30,000 patents worldwide held in the name of one of the Defendants or a related entity, many of which are patents prosecuted in the USPTO in the same technology area as the '806 Patent, giving Defendants intimate knowledge of the art in fields relevant to this civil action. The timing, circumstances and extent of Defendants obtaining actual knowledge of the '806 Patent prior to the commencement of this lawsuit will be confirmed during discovery.

231. Upon gaining knowledge of the '806 Patent, it was, or became, apparent to Defendants that the manufacture, sale, importing, offer for sale, and use of the '806 Accused Products results in infringement of the '806 Patent. On information and belief, Defendants have engaged and will continue to engage in activities constituting inducement of infringement,

notwithstanding their knowledge, or willful blindness thereto, that the activities they induce result in infringement of the '806 Patent.

232. The '806 Accused Products are intended for integration into products known to be sold widely in the United States. Defendants make integrated circuit devices that embody the inventions claimed in the '806 Patent, which devices infringe when they are imported into, or sold, used, or offered for sale in the United States.

233. Defendants indirectly infringe by inducing customers (including fabless design companies) and other downstream parties (such as makers of mobile devices and other devices) to import products that incorporate integrated circuit devices embodying inventions claimed in the '806 Patent, or to sell or use such products, or offer them for sale, in the United States.

234. For example, Defendants induce fabless design companies, importers, resellers, and others who purchase or otherwise obtain devices manufactured at Defendants' overseas facilities to import devices embodying inventions recited in claims of the '806 Patent, or to sell or use such devices, or offer them for sale in the United States without authority.

235. Defendants encourage customers, resellers, or others to import into the United States and sell and use in the United States the '806 Accused Products with knowledge and the specific intent to cause the acts of direct infringement performed by these third parties.

236. On information and belief, after Defendants obtained knowledge of the '806 Patent, the '806 Accused Products have been and will continue to be imported into the United States and sold in large volumes by themselves and by others, such as customers, distributors, and resellers.

237. Defendants work closely with their customers in the process of finalizing circuit designs and planning for the preparation of masks to be used in the manufacturing process, so that these aspects of the manufacturing process are optimized for Defendants' process technologies and

equipment. Defendants also offer their customers outsourced semiconductor testing/analysis, prototyping, mask services, and technical support services.

238. Defendants are aware that the '806 Accused Products are integral components of the products incorporating them, that the infringing integrated circuits are built into the products and cannot be removed or disabled by a purchaser of the products containing the infringing integrated circuit devices, such that Defendants' customers will infringe one or more claims of the '806 Patent by incorporating such integrated circuit devices in other products, and that subsequent importation, sale and use of such products in the United States would be a direct infringement of the '806 Patent. Therefore, Defendants are aware that their customers will infringe one or more claims of the '806 Patent by selling, offering for sale, importing, and/or using the products supplied by Defendants.

239. Defendants directly benefit from and actively and knowingly encourage customers', resellers', and users' importation of these products into the United States and sale and use within the United States. Defendants actively encourage customers, resellers, and downstream users to import, use, and sell in the United States the '806 Accused Products that they manufacture and supply, including through advertising, marketing, and sales activities directed at United States sales.

240. On information and belief, Defendants are aware of the size and importance of the United States market for customers of their products, and distribute or supply these products intended for importation, use, and sale in the United States. Defendants routinely market their infringing the '806 Accused Products to third parties for inclusion in products that are sold to customers in the United States. Defendant TSMC North America, Inc. provides a direct sales outlet

for these products in the United States. Defendants' marketing efforts show that they have specifically intended to and have induced direct infringement in the United States.

241. Defendants have engaged and will continue to engage in additional activities to specifically target the United States market for the '806 Accused Products and actively induce manufacturers, importers, resellers, customers, and end users to directly infringe one or more claims of the '806 Patent in the United States.

242. For example, Defendants have showcased their semiconductor manufacturing capabilities and process technologies at least through written materials distributed in the United States and through the [www.tsmc.com](https://www.tsmc.com/english/dedicatedFoundry/services/info.htm) website in an effort to showcase their process technology, manufacturing, testing, and market applications, and to encourage customers to engage Defendants to produce integrated circuits for inclusion in the customers' devices and products. *See, e.g.*, <https://www.tsmc.com/english/dedicatedFoundry/services/info.htm> (last accessed December 6, 2019).

243. These materials target fabless design companies and integrated semiconductor device manufacturers and generally companies that make, use, offer to sell, sell, or import in the United States products that use integrated circuit devices such as those made by Defendants. Defendants derive significant revenue by selling the '806 Accused Products to third parties who directly infringe the '806 Patent in the United States.

244. Defendants' extensive sales and marketing efforts, sales volume, and partnerships all evidence their intent to induce companies to infringe one or more claims of the '806 Patent by using, offering to sell, selling, or importing products that incorporate the '806 Accused Products in the United States. Defendants have had specific intent to induce infringement or have been willfully blind to the direct infringement they are inducing.

245. On information and belief, Defendants have engaged and will continue to engage in activities constituting contributory infringement of the '806 Patent, including at least claims 1, 12, 23, and 30 pursuant to 35 U.S.C. § 271(c).

246. Defendants contributorily infringe with knowledge that the '806 Accused Products, or the use thereof, infringe the '806 Patent. Defendants knowingly and intentionally contributed to the direct infringement of the '806 Patent by others by supplying these integrated circuit devices that embody a material part of the claimed invention of the '806 Patent, which are known by the Defendants to be specially made or adapted for use in an infringing manner. For example, and without limitation, the '806 Accused Products are used in various end products, such as computers, networking gear, and mobile devices.

247. The '806 Accused Products are not staple articles or commodities of commerce suitable for non-infringing use and are especially made for or adapted for use in infringing the '806 Patent.

248. There are no substantial uses of the '806 Accused Products that do not infringe the '806 Patent.

249. By contributing a material part of the infringing computing products sold, offered for sale, imported, and used by their customers, resellers, and users, Defendants have been and are now indirectly infringing the '806 Patent under 35 U.S.C. § 271(c).

250. Defendants' direct and indirect infringement of the '806 Patent has injured Katana, and Katana is entitled to recover damages adequate to compensate for such infringement pursuant to 35 U.S.C. § 284. Unless they cease their infringing activities, Defendants will continue to injure Katana by infringing the '806 Patent.

251. On information and belief, Defendants acted egregiously and with willful misconduct in that their actions constituted direct or indirect infringement of a valid patent, and this was either known or so obvious that Defendants should have known about it. Defendants continue to infringe the '806 Patent by making, using, selling, offering for sale, and importing in the United States the '806 Accused Products, and to induce the direct infringement of others performing these acts, or they have acted at least in reckless disregard of Katana's patent rights.

252. On information and belief, Defendants will continue their infringement notwithstanding actual knowledge of the '806 Patent and without a good faith basis to believe that their activities do not infringe any valid claim of the '806 Patent. All infringement of the '806 Patent following Defendants' knowledge of the '806 Patent is willful, and Katana is entitled to treble damages and attorneys' fees and costs incurred in this action under 35 U.S.C. §§ 284 and 285.

253. Katana has incurred and will continue to incur substantial damages, including monetary damages.

254. Katana has been and continues to be irreparably harmed by Defendants' infringement of the '806 Patent.

255. Therefore, Katana is entitled to an injunction, actual and/or compensatory damages, reasonable royalties, pre-judgment and post-judgment interest, enhanced damages, and costs.

COUNT VI – INFRINGEMENT OF THE '741 PATENT

256. Katana hereby realleges paragraphs 1 through 255 as though fully set forth herein.

257. Defendants, directly and/or through their subsidiaries, affiliates, agents, and/or business partners, have in the past and continue to directly infringe at least claims 8-10, 12, 15, and 16 of the '741 Patent pursuant to 35 U.S.C. §§ 271(a) and 271(g) by making, using, selling, or offering to sell, and/or importing integrated circuits devices made by practicing and by

performing processes that practice the inventions claimed in the '741 Patent, within the United States and this District.

258. On information and belief, the accused integrated circuit devices include: a semiconductor substrate; a gate insulating layer disposed on the semiconductor substrate; a gate electrode structure disposed on a portion of the gate insulating layer and including at least one conductive layer; a GPOX layer disposed on the sidewalls of the conductive layer of the gate electrode structure and on the surface of the gate insulating layer; an insulating layer for preventing short channel covering the gate electrode structure; spacers disposed on the surface of the insulating layer, which is disposed on the sidewalls of the gate electrode structure; and a source region and a drain region disposed in the semiconductor substrate on either side of the gate electrode structure, wherein each of the source region and the drain region is spaced apart from the gate electrode structure by the sum of the thicknesses of the insulating layer and the GPOX layer, and the insulating layer has a thickness of about 50 Å to about 100 Å.

259. On information and belief, the method of manufacturing the accused integrated circuit devices comprises of: forming a gate insulating layer on a semiconductor substrate; forming a gate electrode structure on a predetermined portion of the gate insulating layer; conformally forming an insulating layer for preventing short channel to a thickness of about 50 Å to about 100 Å on the surface of the semiconductor substrate where the gate electrode structure is formed; and forming a source region and a drain region in the semiconductor substrate on sides of the gate electrode structure.

260. On information and belief, the method of manufacturing the accused integrated circuit devices comprises of: forming a gate insulating layer on a semiconductor substrate; forming a gate electrode structure on a predetermined portion of the gate insulating layer; forming a GPOX

layer by thermally oxidizing the surface of the semiconductor substrate including the gate electrode structure; conformally forming an insulating layer for preventing short channel to a thickness of about 50 Å to about 100 Å on the surface of the semiconductor substrate where the gate electrode structure is formed; implanting low-concentration impurity ions into the semiconductor substrate on sides of the insulating layer disposed on the sidewalls of the gate electrode structure; forming spacers on the surface of the insulating layer disposed on the sidewalls of the gate electrode structure; implanting high-concentration impurity ions into the semiconductor substrate on sides of the spacers; and forming a source region and a drain region by activating the lightly doped impurity ions and the heavily doped impurity ions.

261. Defendants have been and are engaged in one or more of these direct infringing activities related to their integrated circuit devices having transistors and related structures manufactured using their 40nm and/or 45nm ULP CMOS process, representative examples being the integrated circuit devices manufactured for Broadcom as the BCM15900D0KWFBG Touch Screen Controller, Ambiq Micro as the Apollo2 Microcontroller, NVIDIA as the T33-P-A3 Application Processor, Freescale as the MCIMX6Q5EYM10AC Integrated multimedia application processor, and MediaTek as the MT6577 Dual Core Application Processor, and for Sony as the G8232 Rear-Cam ISP.

262. On information and belief, integrated circuit devices made using any of the 40nm or 45nm ULP CMOS processes infringe at least claims 8-10, 12, 15, and 16 of the '741 Patent. Such infringing products are referred to hereinafter as the "'741 Accused Products."

263. Defendants, directly and/or through its subsidiaries, affiliates, agents, and/or business partners, have committed and continue to commit acts of indirect infringement, including at least claims 8-10, 12, 15, and 16 of the '741 Patent pursuant to 35 U.S.C. §§ 271(b) and 271(c)

by actively inducing or contributing to the acts of direct infringement performed by others in the United States, the State of Texas, and this District.

264. Defendants have actual notice of the '741 Patent and the infringement alleged herein at least as early as November 5, 2019.

265. On information and belief, Defendants have numerous lawyers and other active agents of Defendants and of its owned and controlled subsidiaries who regularly review patents and published patent applications relevant to technology in the fields of the Patents-in-Suit, specifically including patents directed to semiconductor devices issued to competitors such as Samsung, the original assignee of the '741 Patent.

266. On information and belief, the Defendants themselves have been issued over 30,000 patents worldwide held in the name of one of the Defendants or a related entity, many of which are patents prosecuted in the USPTO in the same technology area as the '741 Patent, giving Defendants intimate knowledge of the art in fields relevant to this civil action. The timing, circumstances, and extent of Defendants obtaining actual knowledge of the '741 Patent prior to the commencement of this lawsuit will be confirmed during discovery.

267. Upon gaining knowledge of the '741 Patent, it was, or became, apparent to Defendants that the manufacture, sale, importing, offer for sale, and use of the '741 Accused Products results in infringement of the '741 Patent. On information and belief, Defendants have engaged and will continue to engage in activities constituting inducement of infringement, notwithstanding their knowledge, or willful blindness thereto, that the activities they induce result in infringement of the '741 Patent.

268. The '741 Accused Products are intended for integration into products known to be sold widely in the United States. Defendants make integrated circuit devices that embody the

inventions claimed in the '741 Patent, which devices infringe when they are imported into, or sold, used, or offered for sale in the United States. Defendants indirectly infringe by inducing customers (including fabless design companies) and other downstream parties (such as makers of mobile devices and other devices) to import products that incorporate integrated circuit devices embodying inventions claimed in the '741 Patent, or to sell or use such products, or offer them for sale, in the United States.

269. For example, Defendants induce fabless design companies, importers, resellers, and others who purchase or otherwise obtain devices manufactured at Defendants' overseas facilities to import devices embodying inventions recited in claims of the '741 Patent, or to sell or use such devices, or offer them for sale in the United States without authority.

270. Defendants encourage customers, resellers, or others to import into the United States and sell and use in the United States the '741 Accused Products with knowledge and the specific intent to cause the acts of direct infringement performed by these third parties.

271. On information and belief, after Defendants obtained knowledge of the '741 Patent, the '741 Accused Products have been and will continue to be imported into the United States and sold in large volumes by themselves and by others, such as customers, distributors, and resellers.

272. Defendants work closely with their customers in the process of finalizing circuit designs and planning for the preparation of masks to be used in the manufacturing process, so that these aspects of the manufacturing process are optimized for Defendants' process technologies and equipment. Defendants also offer their customers outsourced semiconductor testing/analysis, prototyping, mask services, and technical support services.

273. Defendants are aware that the '741 Accused Products are integral components of the products incorporating them, that the infringing integrated circuits are built into the products

and cannot be removed or disabled by a purchaser of the products containing the infringing integrated circuit devices, such that Defendants' customers will infringe one or more claims of the '741 Patent by incorporating such integrated circuit devices in other products, and that subsequent importation, sale and use of such products in the United States would be a direct infringement of the '741 Patent. Therefore, Defendants are aware that their customers will infringe one or more claims of the '741 Patent by selling, offering for sale, importing, and/or using the products supplied by Defendants.

274. Defendants directly benefit from and actively and knowingly encourage customers', resellers', and users' importation of these products into the United States and sale and use within the United States. Defendants actively encourage customers, resellers, and downstream users to import, use, and sell in the United States the '741 Accused Products that they manufacture and supply, including through advertising, marketing, and sales activities directed at United States sales.

275. On information and belief, Defendants are aware of the size and importance of the United States market for customers of their products, and distribute or supply these products intended for importation, use, and sale in the United States. Defendants routinely market their infringing Integrated Circuit Products to third parties for inclusion in products that are sold to customers in the United States. Defendant TSMC North America, Inc. provides a direct sales outlet for these products in the United States. Defendants' marketing efforts show that they have specifically intended to and have induced direct infringement in the United States.

276. Defendants have engaged and will continue to engage in additional activities to specifically target the United States market for the '741 Accused Products and actively induce

manufacturers, importers, resellers, customers, and end users to directly infringe one or more claims of the '741 Patent in the United States.

277. For example, Defendants have showcased their semiconductor manufacturing capabilities and process technologies at least through written materials distributed in the United States and through the [www.tsmc.com](https://www.tsmc.com/english/dedicatedFoundry/technology/logic.htm) website in an effort to showcase their process technology, manufacturing, testing, and market applications, and to encourage customers to engage Defendants to produce integrated circuits for inclusion in the customers' devices and products. *See, e.g.*, <https://www.tsmc.com/english/dedicatedFoundry/technology/logic.htm> (last accessed December 6, 2019).

278. These materials target fabless design companies and integrated semiconductor device manufacturers and generally companies that make, use, offer to sell, sell, or import in the United States products that use integrated circuit devices such as those made by Defendants. Defendants derive significant revenue by selling the '741 Accused Products to third parties who directly infringe the '741 Patent in the United States.

279. Defendants' extensive sales and marketing efforts, sales volume, and partnerships all evidence their intent to induce companies to infringe one or more claims of the '741 patent by using, offering to sell, selling, or importing products that incorporate the '741 Accused Products in the United States. Defendants have had specific intent to induce infringement or have been willfully blind to the direct infringement they are inducing.

280. On information and belief, Defendants have engaged and will continue to engage in activities constituting contributory infringement of the '741 Patent, including at least claims 8-10, 12, 15, and 16 pursuant to 35 U.S.C. § 271(c).

281. Defendants contributorily infringe with knowledge that the '741 Accused Products, or the use thereof, infringe the '741 Patent. Defendants knowingly and intentionally contributed to the direct infringement of the '741 Patent by others by supplying these integrated circuit devices that embody a material part of the claimed invention of the '741 Patent, which are known by the Defendants to be specially made or adapted for use in an infringing manner. For example, and without limitation, the '741 Accused Products are used in various end products, such as computers, networking gear, and mobile telephones.

282. The '741 Accused Products are not staple articles or commodities of commerce suitable for non-infringing use and are especially made for or adapted for use in infringing the '741 Patent.

283. There are no substantial uses of the '741 Accused Products that do not infringe the '741 Patent.

284. By contributing a material part of the infringing computing products sold, offered for sale, imported, and used by their customers, resellers, and users, Defendants have been and are now indirectly infringing the '741 patent under 35 U.S.C. § 271(c).

285. Defendants' direct and indirect infringement of the '741 Patent has injured Katana, and Katana is entitled to recover damages adequate to compensate for such infringement pursuant to 35 U.S.C. § 284. Unless they cease their infringing activities, Defendants will continue to injure Katana by infringing the '741 Patent.

286. On information and belief, Defendants acted egregiously and with willful misconduct in that their actions constituted direct or indirect infringement of a valid patent, and this was either known or so obvious that Defendants should have known about it. Defendants continue to infringe the '741 Patent by making, using, selling, offering for sale, and importing in

the United States the '741 Accused Products, and to induce the direct infringement of others performing these acts, or they have acted at least in reckless disregard of Katana's patent rights.

287. On information and belief, Defendants will continue their infringement notwithstanding actual knowledge of the '741 Patent and without a good faith basis to believe that their activities do not infringe any valid claim of the '741 Patent. All infringement of the '741 Patent following Defendants' knowledge of the '741 Patent is willful, and Katana is entitled to treble damages and attorneys' fees and costs incurred in this action under 35 U.S.C. §§ 284 and 285.

288. Katana has incurred and will continue to incur substantial damages, including monetary damages.

289. Katana has been and continues to be irreparably harmed by Defendants' infringement of the '741 Patent.

290. Therefore, Katana is entitled to an injunction, actual and/or compensatory damages, reasonable royalties, pre-judgment and post-judgment interest, enhanced damages, and costs.

COUNT VII - INFRINGEMENT OF THE '903 PATENT

291. Katana hereby realleges paragraphs 1 through 290 as though fully set forth herein.

292. Defendants directly and/or through its subsidiaries, affiliates, agents, and/or business partners, have in the past and continue to directly infringe at least claims 8, 9, 11-17, and 19-22 of the '903 Patent pursuant to 35 U.S.C. § 271(a) by making, using, selling, or offering to sell, and/or importing integrated circuits devices that embody the inventions claimed in the '903 Patent, within the United States and this District.

293. On information and belief, the accused integrated circuit devices include a semiconductor device comprising: a semiconductor substrate; a plurality of diffusion layer patterns

formed on the semiconductor substrate; an insulation film formed between the diffusion layer patterns on the semiconductor substrate to isolate the diffusion layer patterns from one another; a pattern portion formed above the diffusion layer patterns and/or the insulation film, the pattern portion using as a material thereof one kind selected from a group consisting of aluminum (Al), tungsten (W), titanium (Ti), copper (Cu), tantalum (Ta), and a chemical compound composed of at least one metal out of aluminum (Al), tungsten (W), titanium (Ti), copper (Cu), and tantalum (Ta); and a through plug formed to have a side surface being in contact with the insulation film, the side surface being surrounded by the insulation film without being in contact with the diffusion layer patterns, and to pass through the insulation film and the semiconductor substrate, the through plug being partly surrounded by the pattern portion above the diffusion layer patterns and/or the insulation film and being insulated from the pattern portion.

294. Defendants have been and are engaged in one or more of these direct infringing activities related to their manufacturing of integrated circuits that employ TSV such as Advanced CMOS Image Sensors, a representative example being the integrated circuit devices manufactured for ON Semiconductor as the AR0430 Stacked Back-Illuminated CMOS Image Sensor.

295. On information and belief, Defendants' integrated circuits that employ TSV infringe at least claims 8, 9, 11-17, and 19-22 of the '903 Patent. Such infringing products are referred to hereinafter as the "'903 Accused Products."

296. Defendants, directly and/or through its subsidiaries, affiliates, agents, and/or business partners, have committed and continue to commit acts of indirect infringement, including at least claims 8, 9, 11-17, and 19-22 of the '903 Patent pursuant to 35 U.S.C. §§ 271(b) and 271(c) by actively inducing or contributing to the acts of direct infringement performed by others in the United States, the State of Texas, and the Western District of Texas.

297. Defendants have actual notice of the '903 Patent and the infringement alleged herein at least as early as November 26, 2019.

298. On information and belief, Defendants have numerous lawyers and other active agents of Defendants and of its owned and controlled subsidiaries who regularly review patents and published patent applications relevant to technology in the fields of the Patents-in-Suit, specifically including patents directed to semiconductor devices issued to competitors such as Toshiba, the original assignee of the '903 Patent.

299. On information and belief, the Defendants themselves have been issued over 30,000 patents worldwide held in the name of one of the Defendants or a related entity, many of which are patents prosecuted in the USPTO in the same technology area as the '903 Patent, giving Defendants intimate knowledge of the art in fields relevant to this civil action. The timing, circumstances and extent of Defendants obtaining actual knowledge of the '903 Patent prior to the commencement of this lawsuit will be confirmed during discovery.

300. Upon gaining knowledge of the '903 Patent, it was, or became, apparent to Defendants that the manufacture, sale, importing, offer for sale, and use of the '903 Accused Products results in infringement of the '903 Patent. On information and belief, Defendants have engaged and will continue to engage in activities constituting inducement of infringement, notwithstanding their knowledge, or willful blindness thereto, that the activities they induce result in infringement of the '903 Patent.

301. The '903 Accused Products are intended for integration into products known to be sold widely in the United States. Defendants make integrated circuit devices that embody the inventions claimed in the '903 Patent, which devices infringe when they are imported into, or sold, used, or offered for sale in the United States.

302. Defendants indirectly infringe by inducing customers (including fabless design companies) and other downstream parties (such as makers of mobile devices and other devices) to import products that incorporate integrated circuit devices embodying inventions claimed in the '861 Patent, or to sell or use such products, or offer them for sale, in the United States.

303. For example, Defendants induce fabless design companies, importers, resellers, and others who purchase or otherwise obtain devices manufactured at Defendants' overseas facilities to import devices embodying inventions recited in claims of the '903 Patent, or to sell or use such devices, or offer them for sale in the United States without authority.

304. Defendants encourage customers, resellers, or others to import into the United States and sell and use in the United States the '903 Accused Products with knowledge and the specific intent to cause the acts of direct infringement performed by these third parties.

305. On information and belief, after Defendants obtained knowledge of the '903 Patent, the '903 Accused Products have been and will continue to be imported into the United States and sold in large volumes by themselves and by others, such as customers, distributors, and resellers.

306. Defendants work closely with their customers in the process of finalizing circuit designs and planning for the preparation of masks to be used in the manufacturing process, so that these aspects of the manufacturing process are optimized for Defendants' process technologies and equipment. Defendants also offer their customers outsourced semiconductor testing/analysis, prototyping, mask services, and technical support services.

307. Defendants are aware that the '903 Accused Products are integral components of the products incorporating them, that the infringing integrated circuits are built into the products and cannot be removed or disabled by a purchaser of the products containing the infringing integrated circuit devices, such that Defendants' customers will infringe one or more claims of the

'903 Patent by incorporating such integrated circuit devices in other products, and that subsequent importation, sale and use of such products in the United States would be a direct infringement of the '903 Patent. Therefore, Defendants are aware that their customers will infringe one or more claims of the '903 Patent by selling, offering for sale, importing, and/or using the products supplied by Defendants.

308. Defendants directly benefit from and actively and knowingly encourage customers', resellers', and users' importation of these products into the United States and sale and use within the United States. Defendants actively encourage customers, resellers, and downstream users to import, use, and sell in the United States the '903 Accused Products that they manufacture and supply, including through advertising, marketing, and sales activities directed at United States sales.

309. On information and belief, Defendants are aware of the size and importance of the United States market for customers of their products, and distribute or supply these products intended for importation, use, and sale in the United States. Defendants routinely market the '903 Accused Products to third parties for inclusion in products that are sold to customers in the United States. Defendant TSMC North America, Inc. provides a direct sales outlet for these products in the United States. Defendants' marketing efforts show that they have specifically intended to and have induced direct infringement in the United States.

310. Defendants have engaged and will continue to engage in additional activities to specifically target the United States market for the '903 Accused Products and actively induce manufacturers, importers, resellers, customers, and end users to directly infringe one or more claims of the '903 Patent in the United States.

311. For example, Defendants have showcased their semiconductor manufacturing capabilities and process technologies at least through written materials distributed in the United States and through the www.tsmc.com website in an effort to showcase their process technology, manufacturing, testing, and market applications, and to encourage customers to engage Defendants to produce integrated circuits for inclusion in the customers' devices and products. *See, e.g.*, <https://www.tsmc.com/english/dedicatedFoundry/technology/cmos.htm> (last accessed December 6, 2019).

312. These materials target fabless design companies and integrated semiconductor device manufacturers and generally companies that make, use, offer to sell, sell, or import in the United States products that use integrated circuit devices such as those made by Defendants. Defendants derive significant revenue by selling the '903 Accused Products to third parties who directly infringe the '903 Patent in the United States.

313. Defendants' extensive sales and marketing efforts, sales volume, and partnerships all evidence their intent to induce companies to infringe one or more claims of the '903 Patent by using, offering to sell, selling, or importing products that incorporate the '903 Accused Products in the United States. Defendants have had specific intent to induce infringement or have been willfully blind to the direct infringement they are inducing.

314. On information and belief, Defendants have engaged and will continue to engage in activities constituting contributory infringement of the '903 Patent, including at least claims 8, 9, 11-17, and 19-22 pursuant to 35 U.S.C. § 271(c).

315. Defendants contributorily infringe with knowledge that the '903 Accused Products, or the use thereof, infringe the '903 Patent. Defendants knowingly and intentionally contributed to the direct infringement of the '903 Patent by others by supplying these integrated circuit devices

that embody a material part of the claimed invention of the '903 Patent, which are known by the Defendants to be specially made or adapted for use in an infringing manner. For example, and without limitation, the '903 Accused Products are used in various end products, such as computers, networking gear, and mobile devices.

316. The '903 Accused Products are not staple articles or commodities of commerce suitable for non-infringing use and are especially made for or adapted for use in infringing the '861 Patent.

317. There are no substantial uses of the '903 Accused Products that do not infringe the '861 Patent.

318. By contributing a material part of the infringing computing products sold, offered for sale, imported, and used by their customers, resellers, and users, Defendants have been and are now indirectly infringing the '903 Patent under 35 U.S.C. § 271(c).

319. Defendants' direct and indirect infringement of the '903 Patent has injured Katana, and Katana is entitled to recover damages adequate to compensate for such infringement pursuant to 35 U.S.C. § 284. Unless they cease their infringing activities, Defendants will continue to injure Katana by infringing the '903 Patent.

320. On information and belief, Defendants acted egregiously and with willful misconduct in that their actions constituted direct or indirect infringement of a valid patent, and this was either known or so obvious that Defendants should have known about it. Defendants continue to infringe the '903 Patent by making, using, selling, offering for sale, and importing in the United States the '903 Accused Products, and to induce the direct infringement of others performing these acts, or they have acted at least in reckless disregard of Katana's patent rights.

321. On information and belief, Defendants will continue their infringement notwithstanding actual knowledge of the '903 Patent and without a good faith basis to believe that their activities do not infringe any valid claim of the '903 Patent. All infringement of the '903 Patent following Defendants' knowledge of the '903 Patent is willful, and Katana is entitled to treble damages and attorneys' fees and costs incurred in this action under 35 U.S.C. §§ 284 and 285.

322. Katana has incurred and will continue to incur substantial damages, including monetary damages.

323. Katana has been and continues to be irreparably harmed by Defendants' infringement of the '903 Patent.

324. Therefore, Katana is entitled to an injunction, actual and/or compensatory damages, reasonable royalties, pre-judgment and post-judgment interest, enhanced damages, and costs.

PRAYER FOR RELIEF

WHEREFORE, Plaintiff Katana requests that judgment be entered in favor of Katana and against the Defendants, and that Katana be granted the following relief:

- (i) A declaration that the '861 Patent is valid and enforceable;
- (ii) A declaration that the '212 Patent is valid and enforceable;
- (iii) A declaration that the '002 Patent is valid and enforceable;
- (iv) A declaration that the '879 Patent is valid and enforceable;
- (v) A declaration that the '806 Patent is valid and enforceable;
- (vi) A declaration that the '741 Patent is valid and enforceable;
- (vii) A declaration that the '903 Patent is valid and enforceable;
- (viii) A declaration that Defendants have directly infringed one or more claims of the '861 Patent, either literally and/or under the doctrine of equivalents;

- (ix) A declaration that Defendants have indirectly infringed one or more claims of the '861 Patent;
- (x) A declaration that Defendants have directly infringed one or more claims of the '212 Patent, either literally and/or under the doctrine of equivalents;
- (xi) A declaration that Defendants have indirectly infringed one or more claims of the '212 Patent;
- (xii) A declaration that Defendants have directly infringed one or more claims of the '002 Patent, either literally and/or under the doctrine of equivalents;
- (xiii) A declaration that Defendants have indirectly infringed one or more claims of the '002 Patent;
- (xiv) A declaration that Defendants have directly infringed one or more claims of the '879 Patent, either literally and/or under the doctrine of equivalents;
- (xv) A declaration that Defendants have indirectly infringed one or more claims of the '879 Patent.
- (xvi) A declaration that Defendants have directly infringed one or more claims of the '806 Patent, either literally and/or under the doctrine of equivalents;
- (xvii) A declaration that Defendants have indirectly infringed one or more claims of the '806 Patent;
- (xviii) A declaration that Defendants have directly infringed one or more claims of the '741 Patent, either literally and/or under the doctrine of equivalents;
- (xix) A declaration that Defendants have indirectly infringed one or more claims of the '741 Patent;
- (xx) A declaration that Defendants have directly infringed one or more claims of the '903 Patent, either literally and/or under the doctrine of equivalents;
- (xxi) A declaration that Defendants have indirectly infringed one or more claims of the '903 Patent;
- (xxii) An award of damages sufficient to compensate Katana for Defendants' infringement of the '861, '212, '002, '879, '806, '741, and '903 Patents pursuant to 35 U.S.C. § 284;
- (xxiii) An award of prejudgment and post-judgment interest pursuant to 35 U.S.C. § 284;
- (xxiv) A payment of ongoing royalties in an amount to be determined for any continued infringement after the date that judgement is entered;
- (xxv) Treble damages for willful infringement as permitted under 35 U.S.C. § 284;

(xxvi) An award of attorneys' fees incurred in prosecuting this action, on the basis that this is an exceptional case provided by 35 U.S.C. § 285;

(xxvii) Enjoin each Defendant, its officers, subsidiaries, agents, servants, and employees, and all persons in active concert with any of the foregoing from further infringement of the '861, '212, '002, '879, '806, '741, and '903 Patents; and

(xxviii) Such other and further relief as this Court shall deem appropriate.

JURY DEMAND

Plaintiff demands a trial by jury of any and all issues triable of right before a jury pursuant to Rule 38 of the Federal Rules of Civil Procedure.

RESERVATION OF RIGHTS

Plaintiff's investigation is ongoing, and certain material information remains in the sole possession of Defendants or third parties, which will be obtained via discovery herein. Plaintiff expressly reserves the right to amend or supplement the causes of action set forth herein in accordance with Rule 15 of the Federal Rules of Civil Procedure.

Dated: December 6, 2019

Respectfully submitted,

/s/ Robert Christopher Bunt

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